



United States Department  
of Agriculture



Natural Resources  
Conservation Service

Lakewood, Colorado

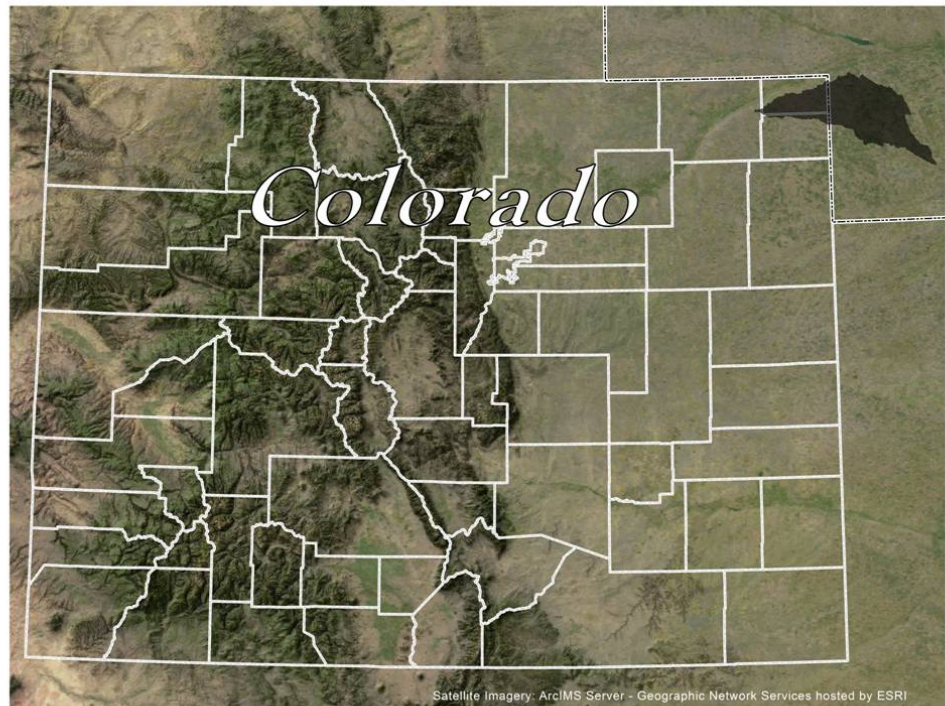
RWA 10250006

December 2008

# Stinking Water Watershed

Hydrologic Unit Code 10250006

## Rapid Assessment





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## Introduction

### Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

### Benefits of these Activities

While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

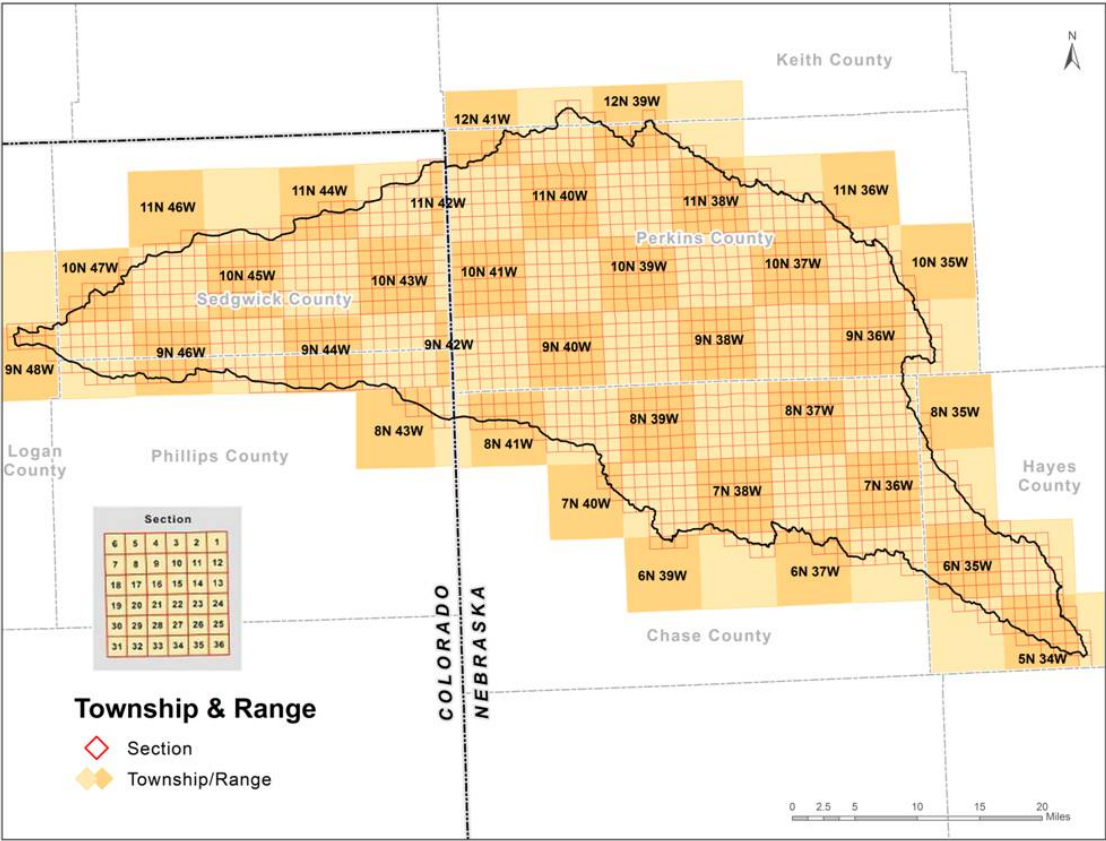
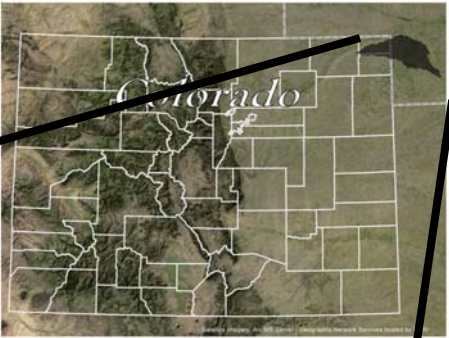
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

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Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.

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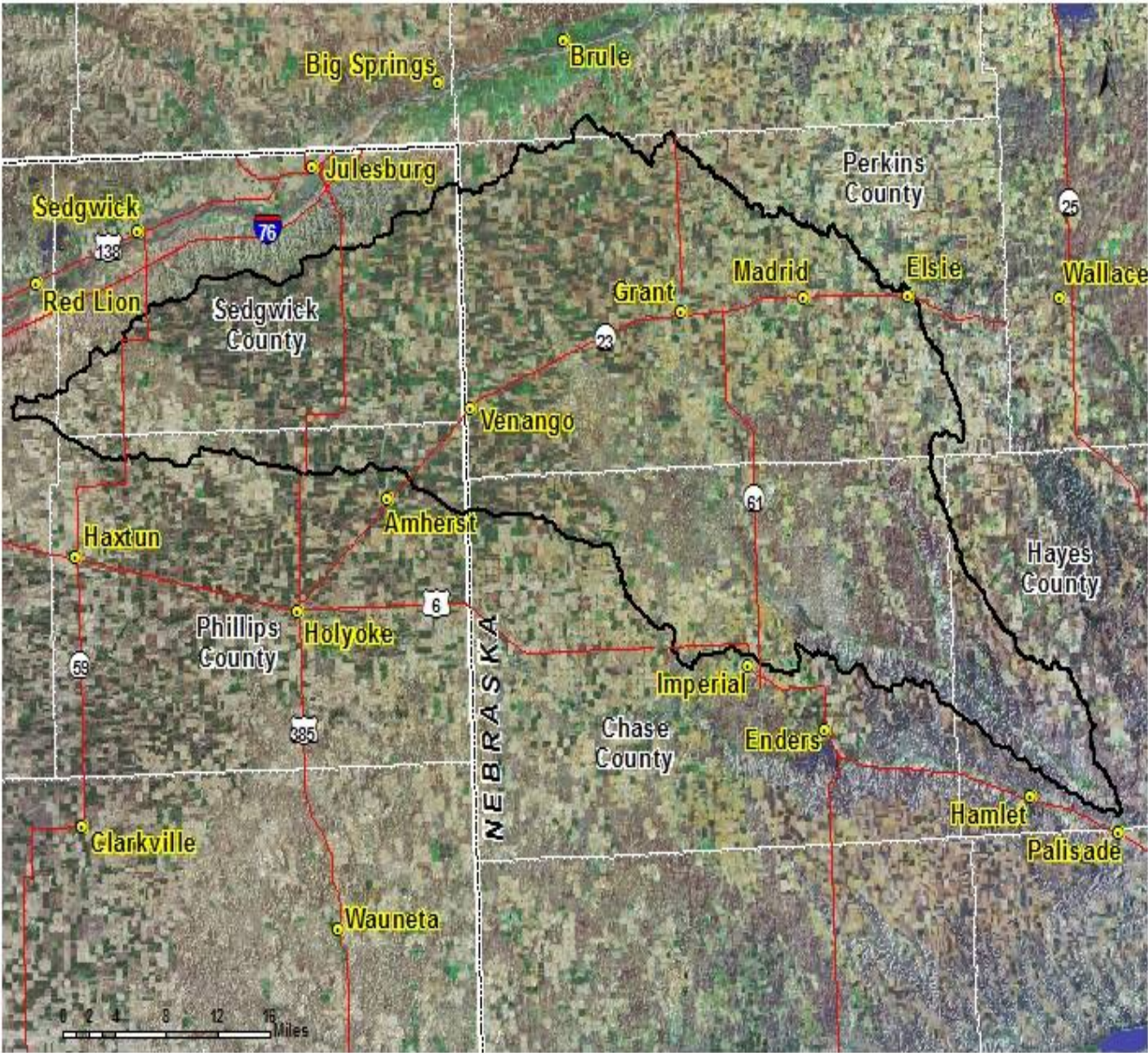
The Stinking Water Watershed is located in the Republican River Basin, on the north eastern plains of Colorado. The watershed is 929,340 acres in size, with 242,563 acres in Colorado. Approximately 638 farms and ranches cover 872,093 acres in the watershed. As of April 2005, there are 41,180 acres of land in the Conservation Reserve Program.



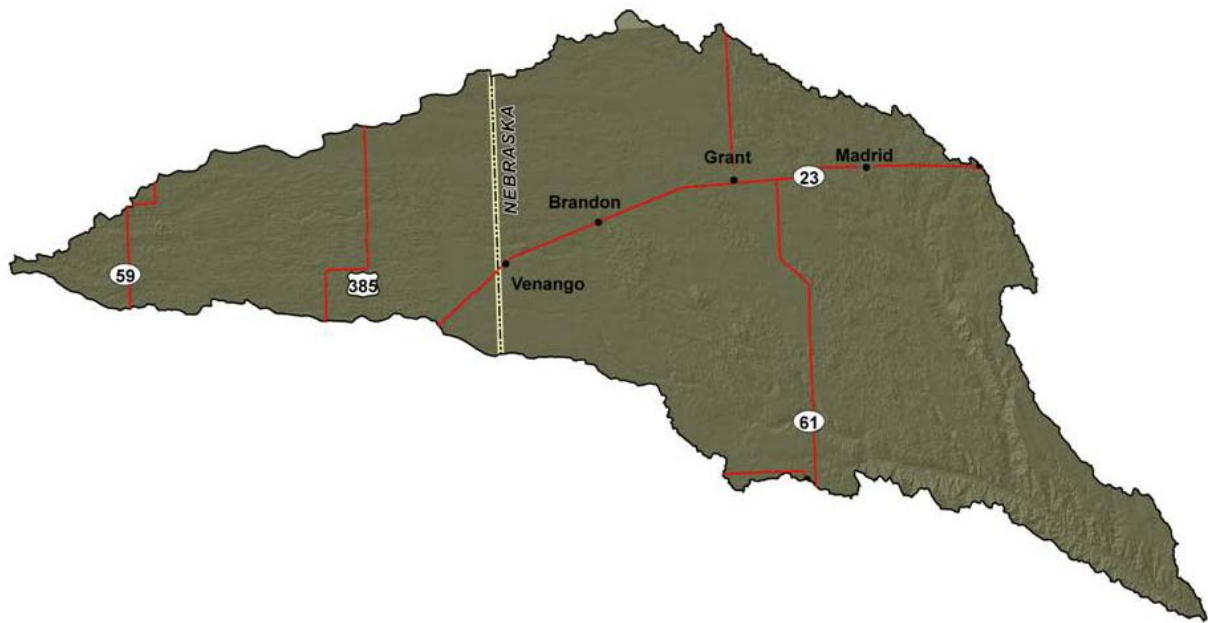
<i>COLORADO</i> County	County Acres	County Acres in STINK- ING WATER Watershed	% of County in the Watershed	% of Watershed in the County
Logan	1,180,481	2,965	0.3%	0.3%
Phillips	440,331	45,334	10.3%	4.9%
Sedgwick	351,884	193,413	55.0%	20.8%
<i>NEBRASKA</i>				
Chase	575,123	223,896	38.9%	24.1%
Hayes	457,410	56,550	12.4%	6.1%
Keith	711,049	1,781	0.3%	0.2%
Perkins	566,580	405,401	71.6%	43.6%
		929,340		



Stinking Water Watershed - 10250006



Satellite Imagery: Arc IMS Server - Geography Network Services hosted by ESRI



**Common Resource Area (CRA)**

◆ 72.1

**Common Resource Areas (CRA):** Geographical areas where resource concerns, problems, and treatment needs are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information are used to determine the geographical boundaries of the common resource area.

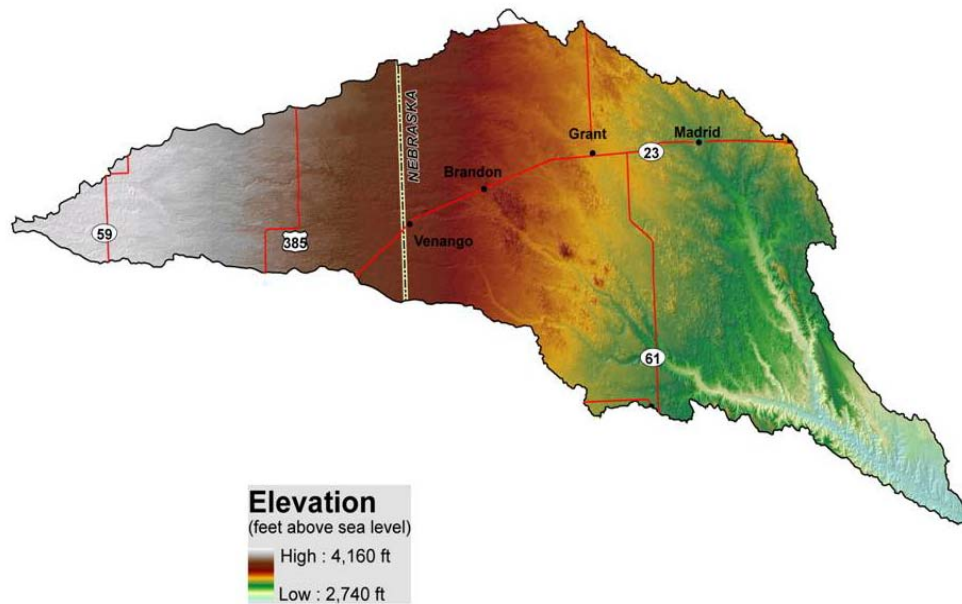
MLRA	CRA	CRA NAME	CRA DESCRIPTION
72	72.1	Central High Tableland	The Central High Tableland CRA is broad, level to gently rolling, loess mantled tableland. Local relief is measured in feet on the tableland tens of feet and major river valleys bordered by steep slopes. Soils are deep. Pre-settlement vegetation was short grass prairies. Nearly all of this area in cropland, both dry land small grain crops and irrigated corn and grain sorghum.



## Physical Description

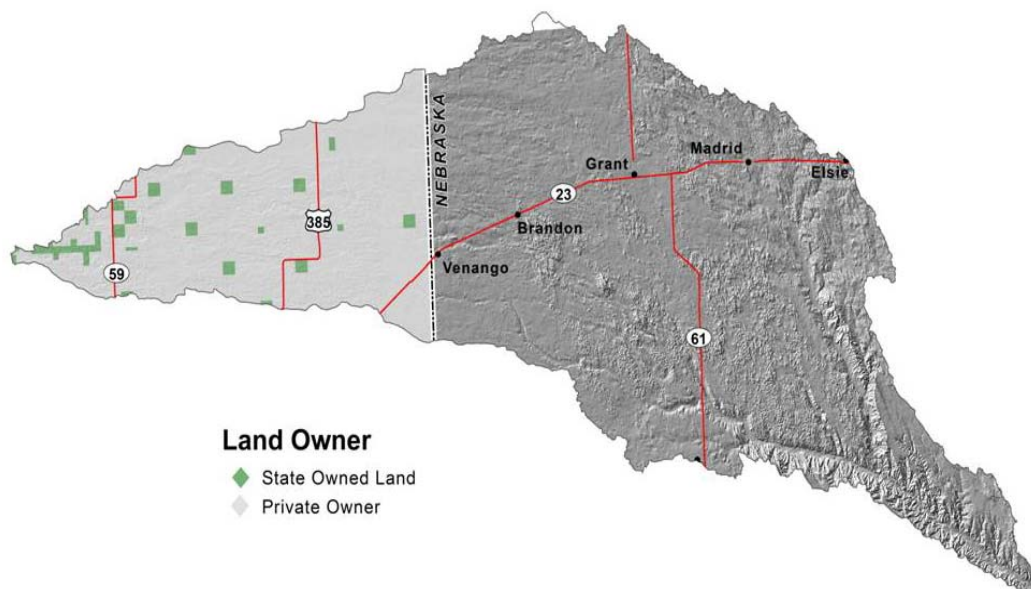
The Stinking Water watershed consists of broad, inter-valley remnants of smooth plain, with gently rolling slopes, punctuated by steeper slopes along the drainages. The Stinking Water River bisects deep, well-drained soils overlaying the Ogallala formation, and cuts into Cretaceous Pierre shale on the eastern edge of the watershed.

The predominant land use is agriculture, consisting of cash grain farming and livestock production. Cropland is dominated by dryland winter wheat rotations, and corn and grain sorghum production in areas where irrigation is available. Steeper slopes are generally in native grasses and used for livestock grazing.

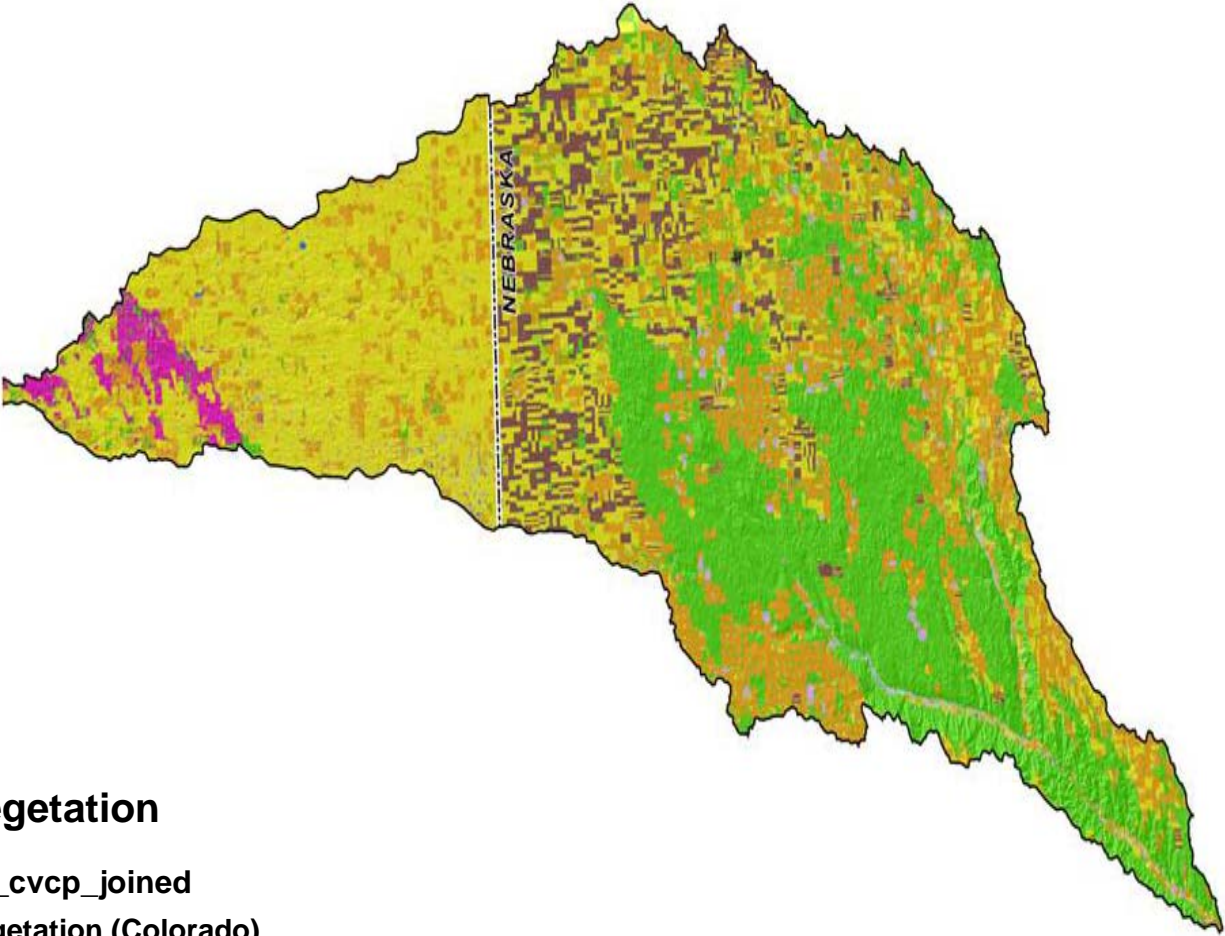


## Land Ownership

Approximately 229,949 acres in the Stinking Water Watershed are privately owned.







# Vegetation

co\_cvcvcp\_joined

Vegetation (Colorado)

- |                     |                     |                     |                      |
|---------------------|---------------------|---------------------|----------------------|
| Orange diamond      | Agriculture Land    | Blue diamond        | Riparian             |
| Yellow diamond      | Dryland Ag          | Magenta diamond     | Sagebrush/Grass Mix  |
| Light green diamond | Grass Dominated     | Light green diamond | Shrub/Grass/Forb Mix |
| Dark green diamond  | Grass/Forb Mix      | Pink diamond        | Soil                 |
| Light blue diamond  | Herbaceous Riparian | Blue diamond        | Water                |
| Orange diamond      | Irrigated Ag        | Grey diamond        | No Data              |

ne\_nlcd

Vegetation (Nebraska)

- |                    |                                      |                      |                              |
|--------------------|--------------------------------------|----------------------|------------------------------|
| Blue diamond       | Water                                | Light green diamond  | Grass Lands/Herbaceous       |
| Black diamond      | Low Intensity Residential            | Light purple diamond | Pasture/Hayland              |
| Grey diamond       | Commercial/Industrial/Transportation | Orange diamond       | Row Crops                    |
| Pink diamond       | Bare Rock/Sand/Clay                  | Yellow diamond       | Small Grains                 |
| Brown diamond      | Quarries/Strip Mines/Gravel Pits     | Dark brown diamond   | Fallow                       |
| Green diamond      | Deciduous Forest                     | Brown diamond        | Urban/Recreational Grasses   |
| Dark green diamond | Evergreen Forest                     | Light blue diamond   | Woody Wetland                |
|                    |                                      | Light blue diamond   | Emergent Herbaceous Wetlands |

## STINKING WATER Land Use Acreages

Colorado Land Use	Total Acreage	Vegetation	Acreage
Cropland	212,137	Agriculture Land	5.07
		Dryland Ag	165,696.45
		Irrigated Ag	46,435.27
Rangeland/Grassland	23,905	Grass Dominated	7,003.13
		Grass/Forb Mix	172.71
		Sagebrush/Grass Mix	16,729.01
		Shrub/Grass/Forb Mix	0.62
Riparian	2,017	Herbaceous Riparian	1,801.88
		Riparian	214.91
Water	892	Water	892.06
Other	2,665	No Data	0.41
		Soil	2,664.13
Total Colorado Watershed Acres			241,616
Nebraska Land Use	Total Acreage	Vegetation	Acreage
Cropland	402,055	Fallow	73,083.78
		Pasture/Hay	13,453.16
		Row Crop	177,088.29
		Small Grains	138,430.05
Rangeland/Grassland	280,091	Grasslands/Herbaceous	280,090.92
Forest	387	Deciduous Forest	291.73
		Evergreen Forest	95.06
Riparian	5,928	Emergent Herbaceous Wetlands	5,861.51
		Woody Wetlands	66.27
Water	362	Water	362.48
Other	1,191	Low Intensity Residential	238.26
		Commercial/Industrial/Transportation	532.44
		Bare Rock/Sand/Clay	335.10
		Quarries/Strip Mines/Gravel Pits	62.51
		Urban/Recreational Grasses	22.25
Total Nebraska Watershed Acres			690,014

## Precipitation

Precipitation in the Stinking Water watershed averages between 16 and 18 inches per year.

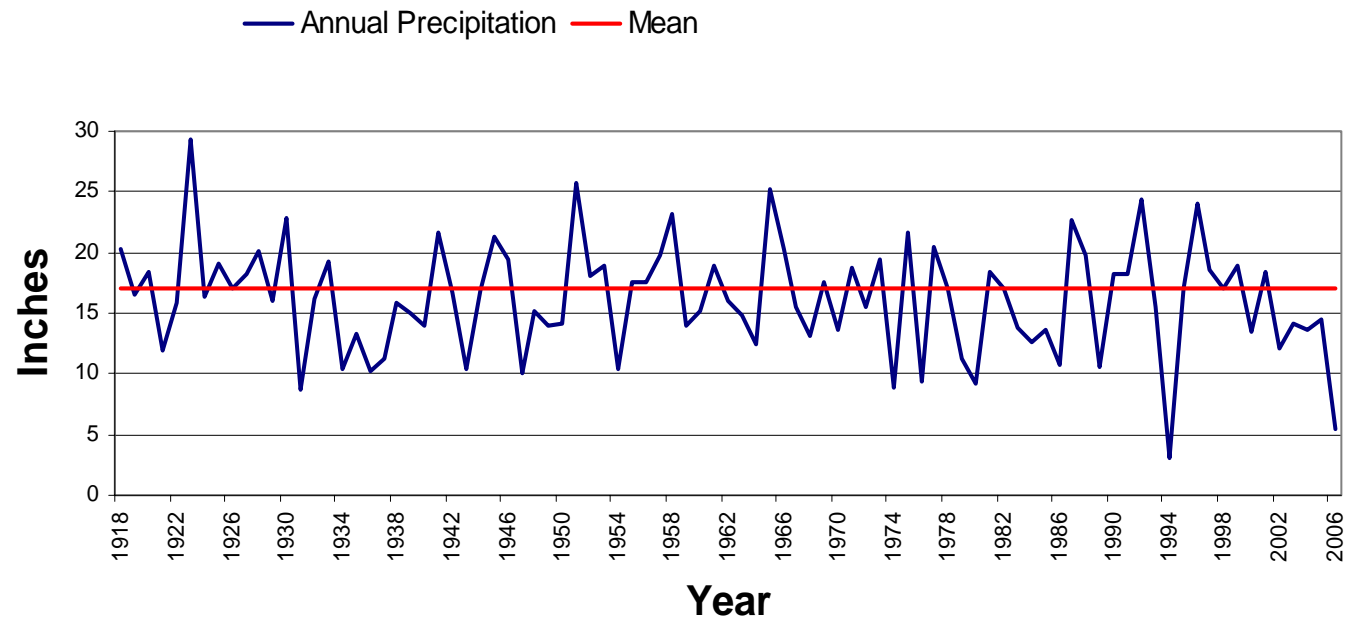
Droughts are common in the watershed, as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. The first took place in the 1910s, and another, in the '30s, caused the dust-

bowl period. The second worst drought on record in the state occurred in the mid-50s, when a series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth serious drought hit parts of Colorado in the late 1970s. In this century, the most severe drought since 1723 hit the state in 2002. Prior to the 1700's, researchers looking at tree ring records found evidence of droughts, even more severe than those during the record period, with some lasting many years.

Rainfall in the watershed typically occurs as frontal storms in the spring and early summer, and as high intensity, convective thunderstorms in late summer. Maximum precipitation is from mid spring through late autumn, and precipitation in winter is snow. The average annual temperature is from 35 to 65 degrees F. The frost free period averages 130 days .



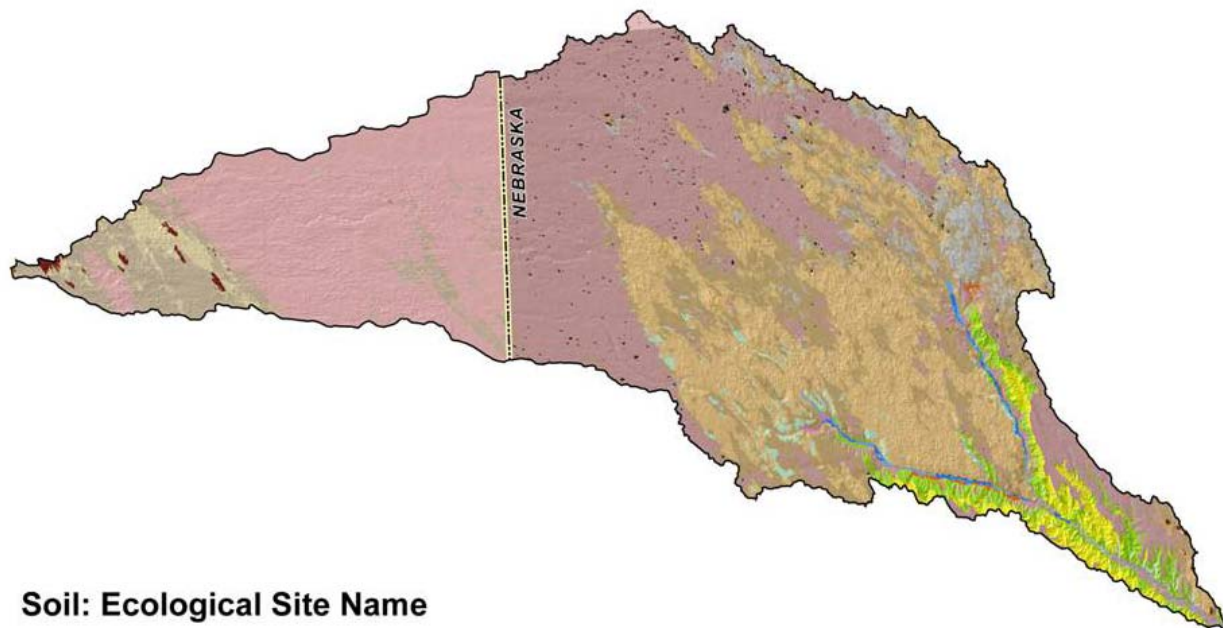
## Stinking Water Annual Precipitation, 1918-2006



## Ecological Sites

The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

Ecological Site maps give an overall indication of the soils plant relationship in the area. More detailed descriptions of ecological sites are provided in the Field Office Technical Guide (FOTG). The FOTG is available in local offices of the Natural Resources Conservation Service (NRCS) and online at <http://www.nrcs.usda.gov/technical/efotg/>.



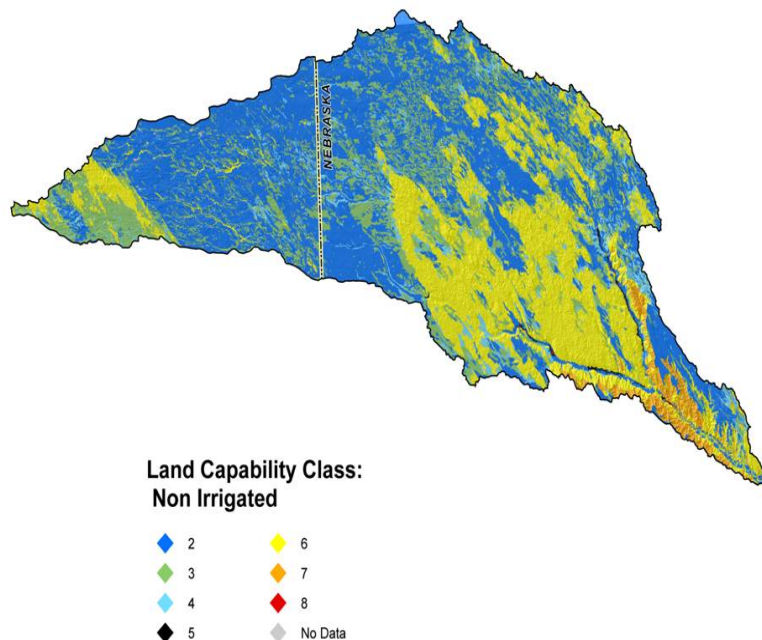
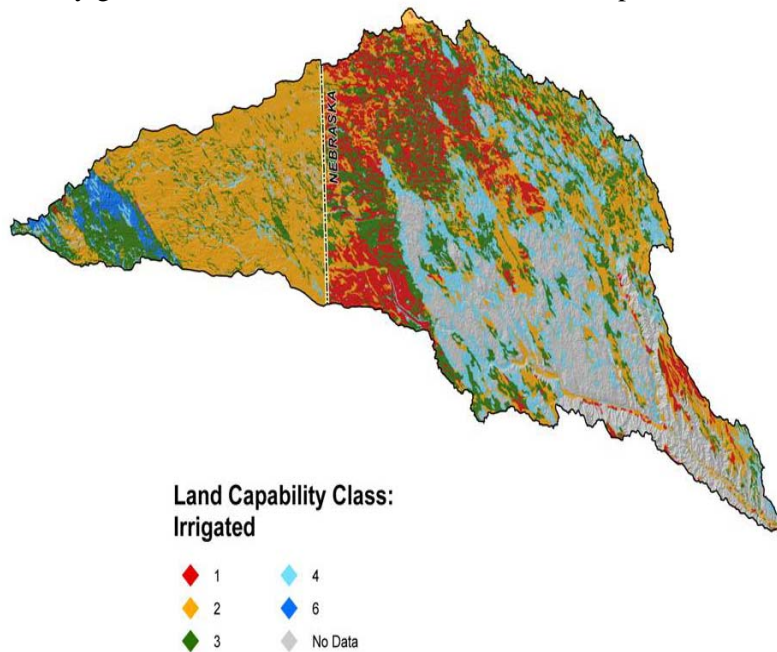
### Soil: Ecological Site Name

◆ No Data	◆ Loamy Bottomland	◆ Sandy
◆ Choppy Sands	◆ Loamy Plains	◆ Sandy Lowland
◆ Closed Upland Depression	◆ Loamy Upland	◆ Sandy Plains
◆ Deep Sands	◆ Loess Breaks	◆ Shallow Limy
◆ Gravel Breaks	◆ Plains Swale	◆ Silty Overflow - Veg. zone 2
◆ Limestone Breaks	◆ Saline Subirrigated	◆ Subirrigated
◆ Limy Upland	◆ Sands	◆ Wet Land - Veg. zone 2



**Land Capability Classification** shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations that show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use.



### Land Capability Classes

**Class 1** - soils have few limitations that restrict their use.

**Class 2** - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

**Class 3** - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

**Class 4** - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

**Class 5** - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

**Class 6** - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

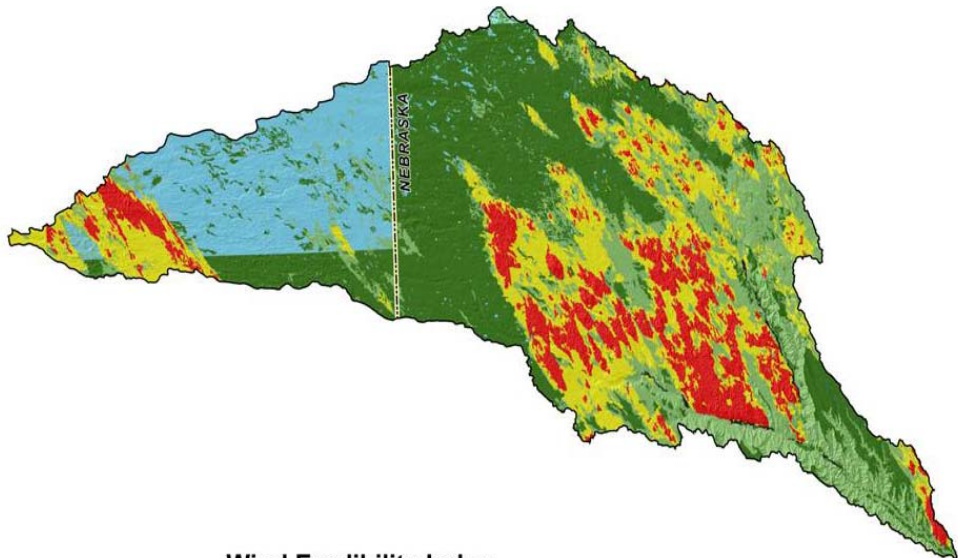
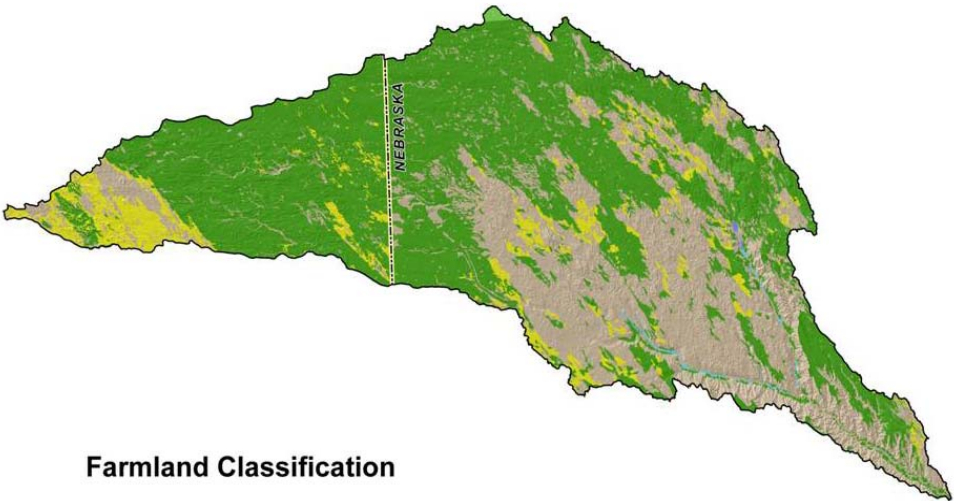
**Class 7** - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

**Class 8** - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wild-

### Farmland Classification

Prime farmland is land that has the best combination of physical characteristics for producing food, feed, forage, fiber and oil seed crops.

Colorado had approximately 1,696,800 acres of nonfederal prime farmland recorded in 1997. This represents over 2 percent of the states total land area or 4 percent of the nonfederal land in Colorado. Nationally, 64 percent of soils classified as prime farmland are being used for cropland. In Colorado, 93 percent of the soils classified as prime farmland are being utilized as cropland.



**The Wind Erodibility Index (WEI):** numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

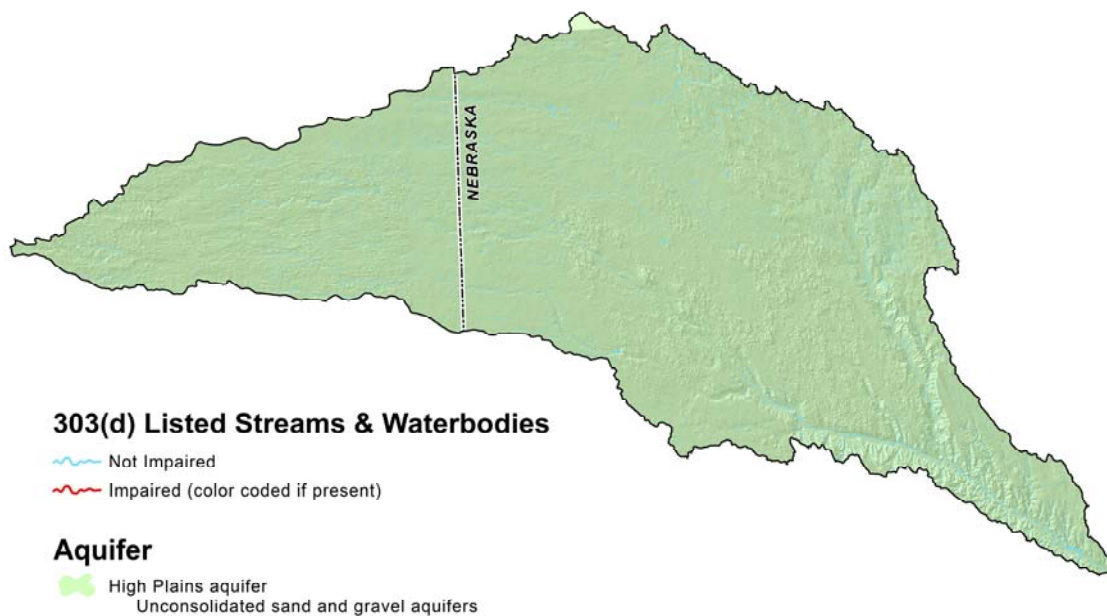
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

As shown on the Wind Erodibility Index map below, most cropland soils in the Stinking Water Watershed are considered highly erodible.

## Surface Water Quality

Surface water quality in the Stinking Water Watershed is generally good. Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met for designated uses. As indicated in the map, there are no 303(d) listed streams in the watershed. The Stinking Water River is designated as Primary Contact Recreation, Aquatic Life Warm I, and Agriculture.

Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs compromising quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards. Updates to the 303d/TMDL list can be found at: [http://www.cdphe.state.co.us/op/wqcc/SpecialTopics/303\(d\)/303dtmdlpro.html](http://www.cdphe.state.co.us/op/wqcc/SpecialTopics/303(d)/303dtmdlpro.html)



## Ground Water

The High Plains Aquifer underlies the Stinking Water watershed, and is the primary source of irrigation and domestic water for the area. The High Plains aquifer is an extensive regional aquifer that underlies the Great Plains states extending from South Dakota on the north to Texas and New Mexico on the south.

Ground water quality is generally good. Total dissolved solids in the aquifer have risen significantly since the early 1900s, and in some areas, the water may exceed drinking water standards for sulfate, chloride, fluoride, iron and arsenic. These concentrations may be naturally derived from geologic sources.

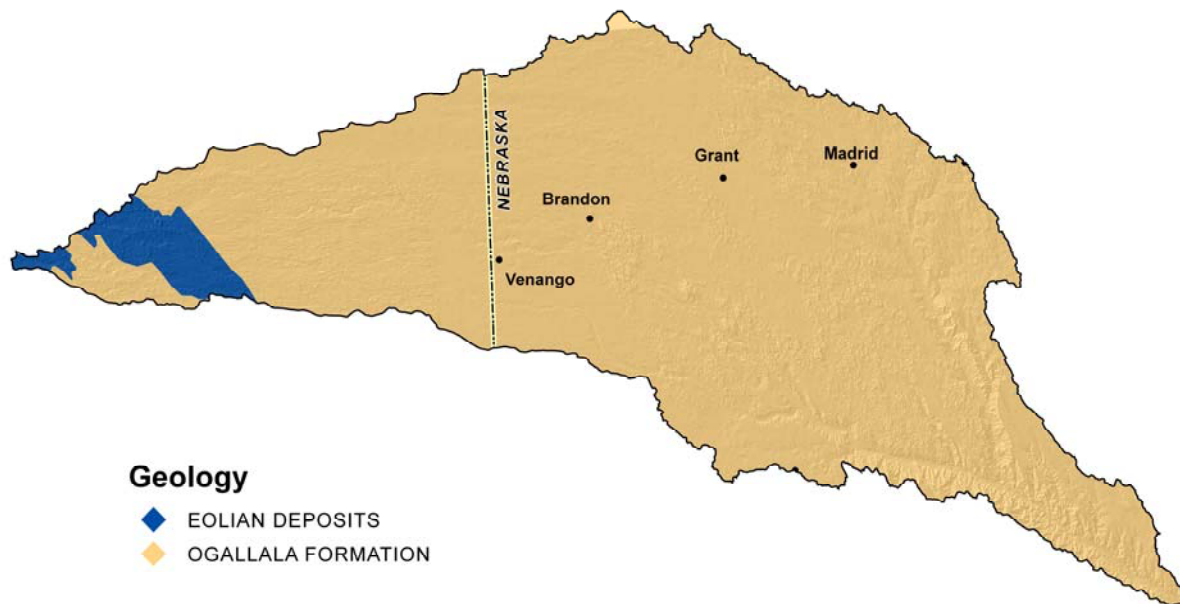


Era	System	Series	Strati-graphic Unit	Unit Thickness (feet)	Physical Characteristics	Hydro-geologic Unit	Hydrologic Characteristics
Cenozoic	Quaternary	Holocene and Pleistocene	Valley-fill deposits	0 to 60	Stream deposits of gravel, sand, silt, clay associated with the most recent cycle of erosion and deposition along present streams	High Plains aquifer	Shallow water-table aquifer(s). Well yields range from 500 to more than 1,000 gpm in several river valleys
			Dune sand	0 to 300	Fine to medium sand with small amounts of clay, silt, and coarse sand formed into hills and ridges by the wind		Typically lies above the water table; has a high infiltration rate and is important for ground-water recharge
			Loess	0 to 250	Silt with lesser amounts of very fine sand and clay deposited as windblown dust		Lies above the water table and does not yield water; serves for minor recharge
		Pleistocene	Unconsolidated alluvial deposits	0 to 550	Stream deposits of gravel, sand, silt, and clay locally cemented by calcium carbonate into caliche or mortar beds		Primary portion of the High Plains aquifer; mostly unconfined; yields range from 100 to 3,100 gpm; typically less than 300 gpm in Colorado; Ogallala is the most significant High Plains aquifer resource
	Tertiary	Miocene	Ogallala Formation	0 to 700	Poorly sorted clay, silt, sand, and gravel generally unconsolidated; forms caliche layers or mortar beds when cemented by calcium carbonate; Ogallala makes up large part of High Plains aquifer		Can be confined; moderately permeable. May yield up to 200 gpm in localized areas
			Arikaree Group	0 to 1,000	Predominantly massive, very-fine to fine-grained sandstone with localized beds of volcanic ash, silty sand, siltstone, claystone, sandy clay, limestone, marl, and mortar beds; part of the High Plains aquifer		Typically confined, except at outcrop; yields typically less than 100 gpm
		Oligocene	White River Group	0 to 700	Upper unit, Brule Formation, is considered part of the High Plains aquifer in Colorado, predominantly massive sandstone containing sandstone beds and channel deposits Lower unit, Chadron Formation, mainly consists of varicolored, bentonitic, loosely to moderately cemented clay and silt		Chadron is mostly impermeable

From Gutentag and others, 1984

## Geology

The Stinking Water Watershed overlies the Ogallala formation. Alluvial Pleistocene deposits and Eolian sands cover much of the uplands surrounding the .





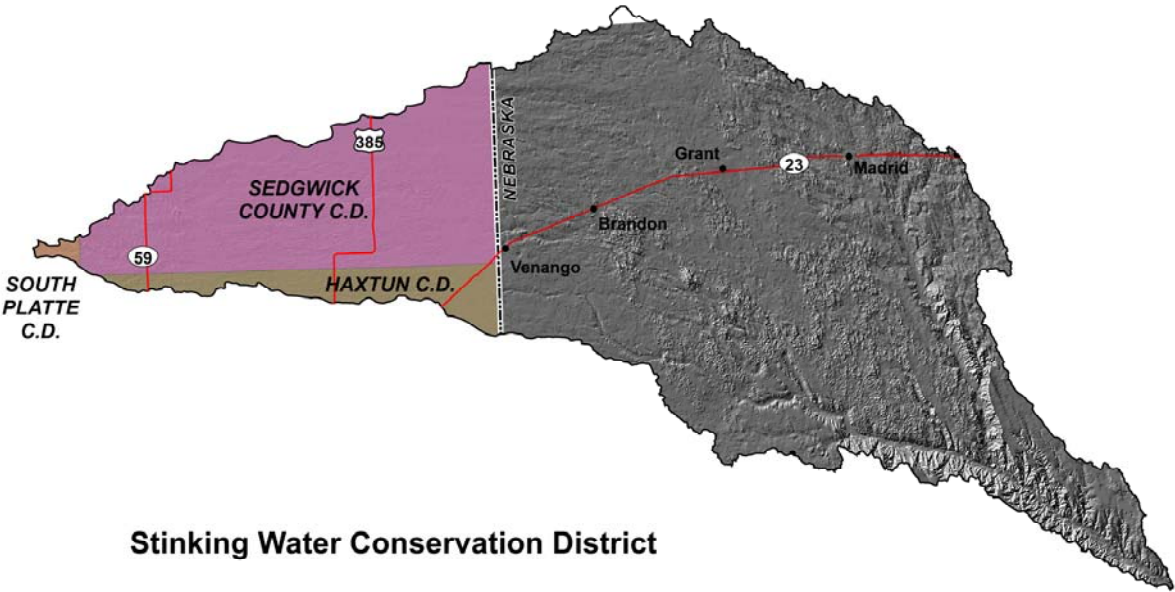
**Threatened & Endangered Species** *State & Federally Threatened, Endangered & Candidate Species as well as Species of Special Concern in Stinking Water Watershed*

	Common Name	Scientific Name	Class	Federal Status	State Status	Comments
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Birds	None	Threatened	May migrate through watershed
	Black-footed Ferret	<i>Mustela nigripes</i>	Mammals	Endangered	Endangered	No current records of occurrence
	Black-tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Mammals	None	Concern	Occurs in the watershed
	Burrowing Owl	<i>Athene cunicularia</i>	Birds	None	Threatened	Occurs in the watershed
	Ferruginous Hawk	<i>Buteo regalis</i>	Birds	None	Concern	Occurs in the watershed
	Long-Billed Curlew	<i>Numenius americanus</i>	Birds	None	Concern	Occurs in the watershed
	Mountain Plover	<i>Charadrius montanus</i>	Birds	None	Concern	Occurs in the watershed
	Northern leopard frog	<i>Rana pipiens</i>	Amphibians	None	Concern	May occur in the watershed
	Plains Leopard Frog	<i>Rana blairi</i>	Amphibians	None	Concern	May occur in the watershed
	Plains Sharp-tailed Grouse	<i>Tympanuchus phasianellus jamesii</i>	Birds	None	Endangered	Occurs in the watershed
	Swift fox	<i>Vulpes velox</i>	Mammals	None	Concern	Occurs in the watershed
	Yellow mud turtle	<i>Kinosternon flavescens</i>	Reptiles	None	Concern	May occur in the watershed

Shortgrass prairie, sandsage-mixed grass rangeland, and both irrigated and dry cropland are the dominant terrestrial habitat types in this watershed. Burrowing owl, mountain plover, black-tailed prairie dog, and swift fox are representative species for the shortgrass habitat. Greater prairie chickens use the sand sage-mixed grass rangeland habitats. Water is scarce and the native species in this watershed are those that can survive without abundant water supplies. Riparian areas, playa lakes, and the occasional stock pond provide seasonal to intermittent aquatic habitats. Economically important wildlife species that occur in large areas of the watershed include mule and white-tailed deer, mourning dove, and pheasant. Greater prairie chicken and plains sharp-tailed grouse occur in the western part of the watershed.

## Social Data

	Logan	Phillips	Sedgwick
<b>Demographics (US Census, American Factfinder)</b>			
Total population		4,480	2,747
Male		2,164	1,374
Female		2,316	1,373
Median age (years)		39.8	43.2
White		4,168	2,486
Black or African American		9	14
American Indian and Alaska Native		13	4
Asian		18	21
Native Hawaiian and Other Pacific Islander		1	2
Some other race		211	164
Hispanic or Latino (of any race)		527	314
<b>Economic Characteristics (US Census, American Factfinder)</b>			
In labor force (population 16 years and over)		2,039	1,340
Median household income (dollars)		32,177	28,278
Median family income (dollars)		38,144	33,953
Per capita income (dollars)		16,394	16,125
Families below poverty level		110	62
Individuals below poverty level		507	270
<b>County Agricultural Characteristics (Colorado Agricultural Census, county data tables)</b>			
Farms (number)	930	334	188
Land in farms/ranches (acres)	1,111,135	470,837	274,243
Average size farm/ranch (acres)	1,195	1,410	1,459
Median size farm (acres)	608	1,000	830
Average age of farmer or rancher	52.8	53.4	56.4
Net cash return from ag sales (\$1,000)	5,092	13,313	7,716
Cattle and calves (number)	185,000	30,000	15,000



Stinking Water Conservation District

Stinking Water Watershed Natural Resource Concerns

Resource Concern By Priority	Sedgwick	Haxtun	Total
Water Quantity	5	5	10
Soil Erosion	4	6	10
Water Quality	5	4	9
Invasive Weeds	3	3	6
Wildlife Habitat	1	2	3
Rangeland Health	2		2

Note: The Colorado Conservation Districts identified and prioritized these resource concerns during facilitated public meetings and they are included in their Long Range Plans. Higher scores indicate higher priority.

## Selected Conservation Application Data

## Stinking Water 10250006

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total
Total Conservation Systems Planned (Acres)	19,571	13,056	Not Avail.	9,380	8,712	1,080	51,799
Total Conservation Systems Applied (Acres)	14,135	3,357	Not Avail.	5,266	2,960	10,842	36,560
<b>Practices</b>							
Prescribed Grazing	3,608	0	0	93	160	29	3,890
Upland Wildlife Habitat Management	3,555	1,208	3,752	397	577	1,777	11,266
Conservation Cropping System	0	0	6,009	1,264	566	1,077	8,916
Residue Management	4,421	0	1,101	1,444	571	1,617	9,154
Irrigation Water Management	7,459	2,406	1,510	267	126	230	11,998

## Conservation Systems to Address Major Resource Concerns

<b>Primary Resource Concern:</b>		<b>Rangeland Health</b>		
<b>Conservation System Description:</b>	Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. Estimate 20,000 acres need to be treated on medium sized ranches of 2,500 acres.			<b>Based on Conservation System Guide Code:</b>
				CO 72.1-GR-01-R-Grazing
<b>Practices</b>	<b>Unit</b>	<b>Quantity</b>	<b>Cost/Unit (\$)</b>	<b>Estimated Cost (\$)</b>
Prescribed Grazing:				
Fence (382)	Ft.	20,000	0.6	13,200
Pest Management (595)	Ac.	500	5.0	2,500
Pipeline (516)	Ft.	6,000	2.40	14,400
Upland Wildlife Habitat Management (645)	Ac.	500	na	0
Watering Facility (614)	No.	3	410	1,230
Windbreak/Shelterbelt Establishment (380)	Ft.	3,000	.85	2,550
Costs to apply prescribed grazing per median sized ranch of 2,500 acres	No.	8	33,880	
<b>Subtotal: Rangeland costs</b>				<b>\$271,040</b>



## Conservation Systems to Address Major Resource Concerns (cont'd)

<b>Primary Resource Concern: Soil Erosion By Wind on dryland crops</b>				
<b>Conservation System Description:</b>		Seasonal residue management with Conservation crop rotation, Nutrient and Pest Mgt		<b>Reference Conservation System Guide Code:</b> <a href="#">CO 72.1-CR-Dryland-R-2</a>
<b>Practices</b>	<b>Unit</b>	<b>Quantity</b>	<b>Cost/Unit (\$)</b>	<b>Estimated Cost (\$)</b>
Conservation Crop Rotation (328)	Ac	94,068	5	470,340
Residue Mgmt, Seasonal (344)	Ac	94,068	5	470,340
Nutrient Management (590)	Ac	23,000	5	115,000
Pest Management (595)	Ac	10,000	15	150,000
<b>Subtotal Costs Dryland Crops:</b>				<b>\$1,205,680</b>
<b>Primary Resource Concern: Water Quality/Quantity</b>				
<b>Conservation System Description:</b>		Upgrading Sprinkler irrigation system with IWM, Crop rotation, Nutrient and Pest Management		<b>Reference Conservation System Guide Code:</b> <a href="#">CO 72.1-CR-Sprinkler-R-2</a>
<b>Practices</b>	<b>Unit</b>	<b>Quantity</b>	<b>Cost/Unit (\$)</b>	<b>Estimated Cost (\$)</b>
Irrigation Water Management (449)-includes re-bowl, renozzle, and IWM	Ac	36,000	10.20	367,200
Nutrient Management (590)	Ac	20,000	5	100,000
Pest Management (595)	Ac	20,000	15	300,000
<b>Subtotal Irrigation Costs:</b>				<b>\$767,200</b>

## General Effects, Impacts, and Estimated Costs of Application of Conservation Systems

Landuse	Resource Concern	Measurable Effects	Non-measurable Effects	Estimated Cost (\$)
Rangeland	Plants		Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter. Wildlife habitat is sustained or improved.	\$271,040
Dryland Crop	Soil	423,306 Total Tons/Year saved	Cropland sustainability	\$1,205,680
Irrigated Crops	Water		Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely affected.	\$767,200
<b>Estimated Total Costs to Address Major Resource Concerns:</b>				<b>\$1,476,720</b>

## FOOTNOTES/ BIBLIOGRAPHY

**303(d)** listed streams within the Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit <http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf>. Stream data from National Hydrologic Dataset <http://nhd.usgs.gov>

**Threatened and Endangered Species** information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS). NDIS GIS data may be downloaded at <http://ndis.nrel.colostate.edu>. For more information on Colorado's Endangered & Threatened Species, as well as Species of Concern, visit <http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/ThreatenedEndangeredList/ListOfThreatenedAndEndangeredSpecies.htm> or <http://mountainprairie.fws.gov/endspp/CountyLists/COLORADO.htm>

**Resource Concerns** were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. Only the top three environmental resource concerns for each district were used. For more information on Colorado's Conservation Districts, visit <http://www.cacd.us>.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado & Nebraska surveys:

Logan County (CO075) Published 01/30/2008  
Phillips County (CO095) Published 01/30/2008  
Sedgwick County CO115) Published 01/30/2008

Chase County (NE029) Published 01/17/2007  
Hayes County (NE085) Published 11/21/2006  
Keith County (NE101) Published 11/21/2006  
Perkins County (NE135) Published 01/05/2007

**Vegetation** data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. Completed in 2003, the CVCP is a landscape level vegetation dataset created using Landsat TM imagery and then formatted for GIS use. The species identified are an overview of the most common species associated in each cover type, in order of greatest occurrence. For more information on the Colorado Vegetation Classification Project, visit <http://ndis.nrel.colostate.edu/coveg>. All border state (if applicable) vegetation data courtesy of the National Land Cover Dataset (NLCD). For more information visit [http://www.mrlc.gov/mrlc2k\\_nlcd.asp](http://www.mrlc.gov/mrlc2k_nlcd.asp)

**Common Resource Area** (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. Geographic boundaries of a CRA are determined by landscape conditions, soil, climate, human considerations and other natural resource information. For more information on Common Resource Areas visit <http://soils.usda.gov/survey/geography/cra.html>.

**Average Annual Precipitation** data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information on PRISM data visit <http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html> or for more information about technical aspects of PRISM, visit the PRISM website at <http://www.ocs.orst.edu/prism>.

**Land Ownership** (status, 07/22/2006 dataset) data was obtained from the Bureau of Land Management, Colorado State Office. For more information, visit [http://www.blm.gov/co/st/en/BLM\\_Programs/geographical\\_sciences/gis.html](http://www.blm.gov/co/st/en/BLM_Programs/geographical_sciences/gis.html)

**Relief & Elevation** maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). A hillshade grid was created from the 30m DEM to create a 3D effect. For more information about the NED visit <http://ned.usgs.gov>. The data was downloaded from the NRCS Geospatial Data Gateway at <http://datagateway.nrcs.usda.gov>.